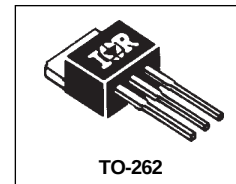


## 40CTQ045L

### SCHOTTKY RECTIFIER

40 Amp



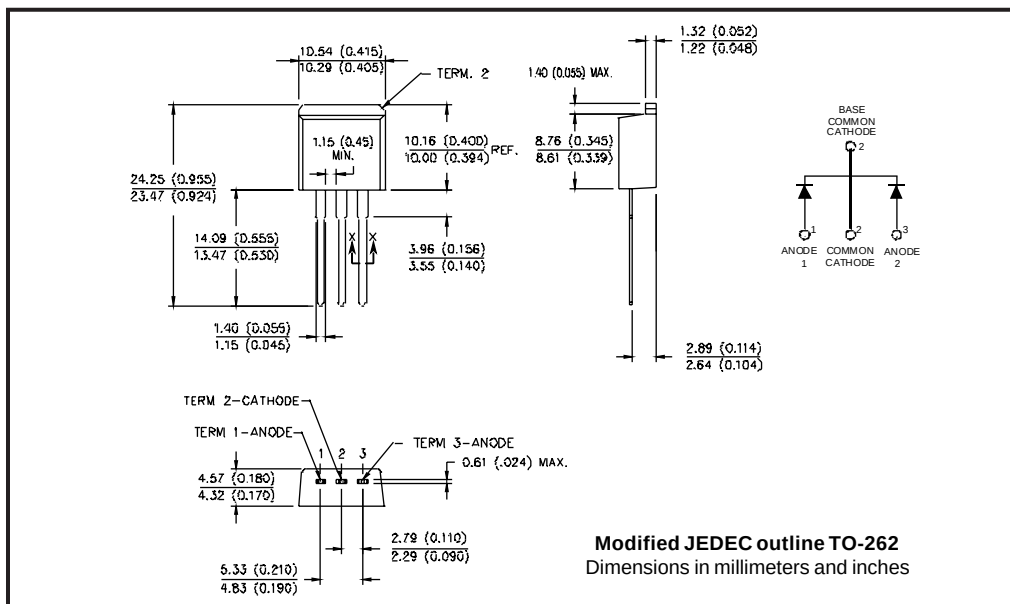
#### Major Ratings and Characteristics

| Characteristics                               | 40CTQ...L  | Units      |
|-----------------------------------------------|------------|------------|
| $I_{F(AV)}$ Rectangular waveform              | 40         | A          |
| $V_{RRM}$                                     | 45         | V          |
| $I_{FSM}$ @ $t_p = 5 \mu s$ sine              | 1240       | A          |
| $V_F$ @ 20 Apk, $T_J = 125^\circ C$ (per leg) | 0.48       | V          |
| $T_J$ range                                   | -55 to 150 | $^\circ C$ |

#### Description/Features

The 40CTQ045L center tap Schottky rectifier series has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to  $150^\circ C$  junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- $150^\circ C$   $T_J$  operation
- Center tap TO-262 package
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



# 40CTQ045L

Preliminary Data Sheet PD-20572 11/98

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## Voltage Ratings

| Part number                                     | 40CTQ045L |
|-------------------------------------------------|-----------|
| $V_R$ Max. DC Reverse Voltage (V)               | 45        |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |           |

## Absolute Maximum Ratings

| Parameters                                                                           | 40CTQ...L   | Units | Conditions                                                                                                                                                 |
|--------------------------------------------------------------------------------------|-------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_{F(AV)}$ Max. Average Forward (Per Leg)<br>Current * See Fig. 5 (Per Device)      | 20<br>40    | A     | 50% duty cycle @ $T_C = 116^\circ\text{C}$ , rectangular waveform                                                                                          |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive<br>Surge Current (Per Leg) * See Fig. 7 | 1240<br>350 | A     | 5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse<br>10ms Sine or 6ms Rect. pulse<br>Following any rated load condition and with rated $V_{RRM}$ applied |
| $E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)                                   | 20          | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 3$ Amps, $L = 4.40$ mH                                                                                                |
| $I_{AR}$ Repetitive Avalanche Current (Per Leg)                                      | 3           | A     | Current decaying linearly to zero in 1 $\mu\text{sec}$<br>Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical                                   |

## Electrical Specifications

| Parameters                                                       | 40CTQ...L                    | Units            | Conditions                                                                                |
|------------------------------------------------------------------|------------------------------|------------------|-------------------------------------------------------------------------------------------|
| $V_{FM}$ Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)    | 0.53<br>0.68<br>0.48<br>0.67 | V                | @ 20A<br>@ 40A<br>@ 20A<br>@ 40A<br>$T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$ |
| $I_{RM}$ Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1) | 3<br>115                     | mA               | $T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$<br>$V_R = \text{rated } V_R$        |
| $V_{F(TO)}$ Threshold Voltage                                    | 0.27                         | V                | $T_J = T_J \text{ max.}$                                                                  |
| $r_l$ Forward Slope Resistance                                   | 8.72                         | m $\Omega$       |                                                                                           |
| $C_T$ Max. Junction Capacitance (Per Leg)                        | 2800                         | pF               | $V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$                   |
| $L_S$ Typical Series Inductance (Per Leg)                        | 8.0                          | nH               | Measured lead to lead 5mm from package body                                               |
| $dv/dt$ Max. Voltage Rate of Change (Rated $V_R$ )               | 10,000                       | V/ $\mu\text{s}$ |                                                                                           |

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%

## Thermal-Mechanical Specifications

| Parameters                                                                 | 40CTQ...L                | Units              | Conditions                           |
|----------------------------------------------------------------------------|--------------------------|--------------------|--------------------------------------|
| $T_J$ Max. Junction Temperature Range                                      | -55 to 150               | $^\circ\text{C}$   |                                      |
| $T_{stg}$ Max. Storage Temperature Range                                   | -55 to 150               | $^\circ\text{C}$   |                                      |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Leg) * See Fig. 4 | 2.0                      | $^\circ\text{C/W}$ | DC operation                         |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package)          | 1.0                      | $^\circ\text{C/W}$ | DC operation                         |
| $R_{thCS}$ Typical Thermal Resistance, Case to Heatsink                    | 0.50                     | $^\circ\text{C/W}$ | Mounting surface, smooth and greased |
| $w_t$ Approximate Weight                                                   | 2(0.07)                  | g(oz.)             |                                      |
| $T$ Mounting Torque                                                        | Min. 6(5)<br>Max. 12(10) | Kg-cm<br>(lbf-in)  |                                      |
| Case Style                                                                 | TO-262                   |                    | JEDEC                                |

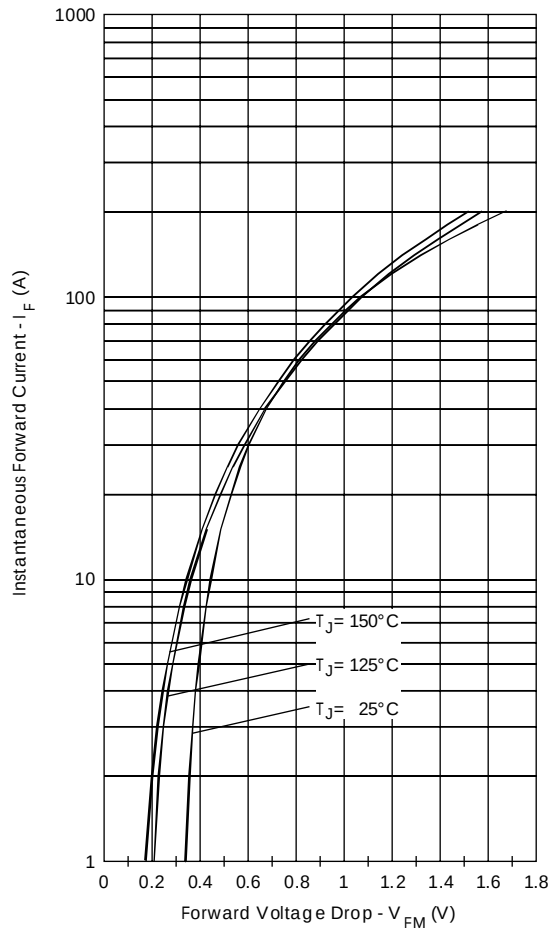


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

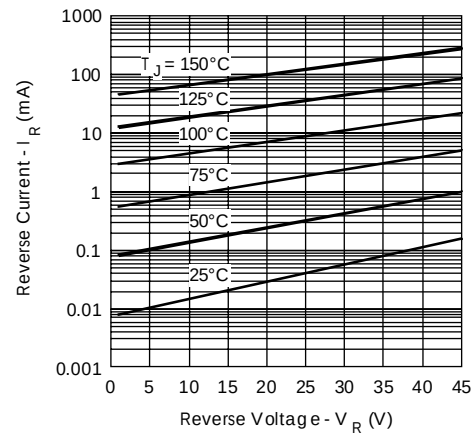


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

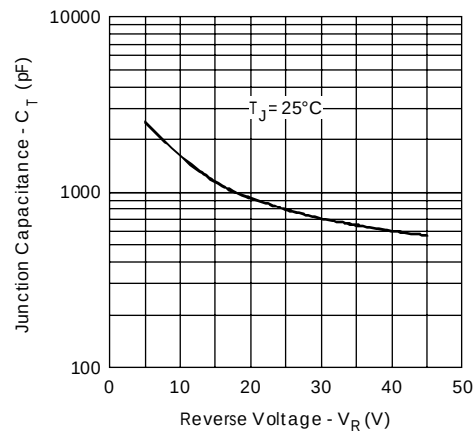


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

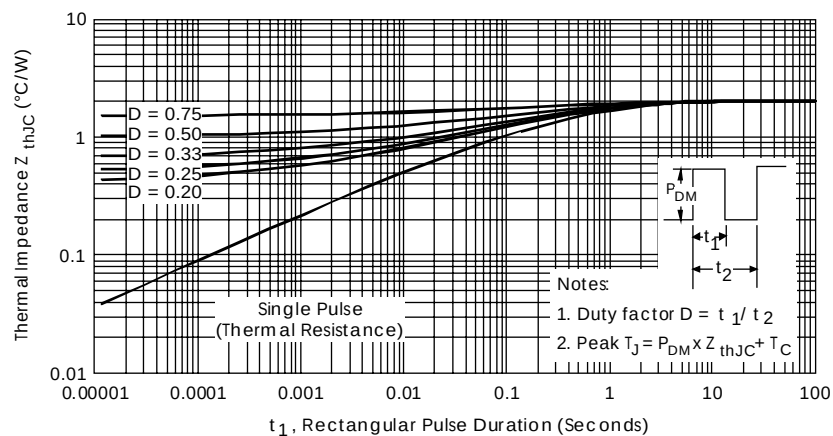


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

# 40CTQ045L

Preliminary Data Sheet PD-20572 11/98

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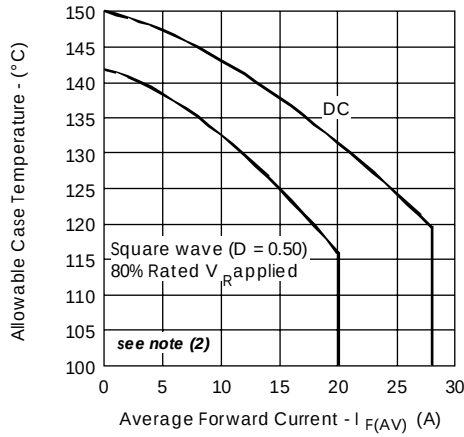


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

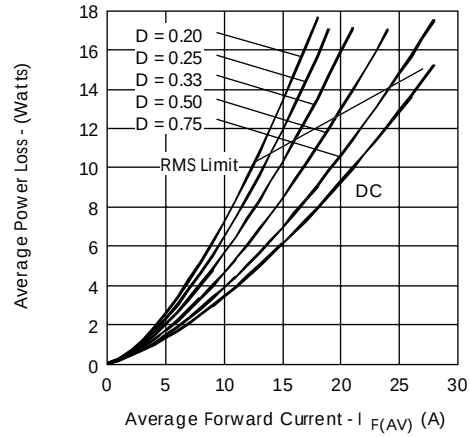


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

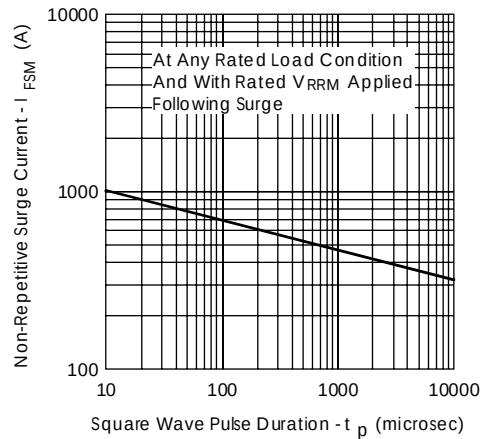


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

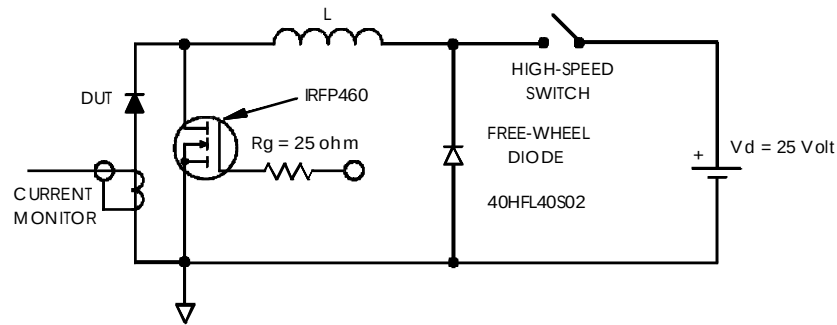


Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used:  $T_c = T_j - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;

$P_d$  = Forward Power Loss =  $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);

$P_{d_{REV}}$  = Inverse Power Loss =  $V_{R1} \times I_{R1} (1 - D)$ ;  $I_{R1} @ V_{R1} = 80\%$  rated  $V_R$

International  
**IOR** Rectifier

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Data and specifications subject to change without notice.